贵州原尾虫一新属及其幼虫期的*记述暨成立亚马逊蚖属的建议

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1985年秋本所同志从贵州省采回大批原尾虫标本，其中在遵义市内一个小丘上所采的标本，经鉴定系一新种和新属，这一新种和亚洲檗蚖科的种类颇不相同，却和南美洲的种类十分近似，现记述如下。模式标本保存于中国科学院上海昆虫研究所。

关键词：原尾虫，南蚖属，亚马逊蚖属，贵州省，幼虫期

南蚖属 *Notentulus* gen. nov. **新属**

模式种：**遵义南蚖** *Notentulus zunyinicus* Yin，新种

属檗蚖科。口器微小，下唇须退化，生有2-4根刚毛和1感器。颚腺管上具心形萼和远侧的分叶或瘤泡状突起。前跗感觉毛 t-1 棍棒状；t-3 较短，呈瓶状或柳叶形；b′ 缺如。第Ⅱ-Ⅲ对腹足各1节，各生一长一短刚毛2根。腹部第Ⅰ-Ⅵ节前排刚毛成对，而第Ⅶ节背板前排刚毛单数，有中央毛Ac。腰带退化但栅纹尚清楚，栅纹甚短且排列不甚整齐。栉梳略倾斜后缘具稀疏的尖齿。雌性外生殖器的基内骨细弱，端阴刺尖细。

新组合：热带南蚖 *Notentulus tropicus* (Bonet 1942)

同种异名：*Acerentulus tropicum* Bonet 1942

Acerentulus tropicus Tuxen 1961

Berberentulus tropicus Tuxen 1964

遵义南蚖 *Notentulus zunyinicus* 新种（图1—16）

全长1300—1460μ。头部前端有短喙长8—10μ，头长124—133μ，宽89—94μ。假眼扁圆形8-9×10-12μ，头眼比=14—16。口器甚小，下唇须生4刚毛1感器；颚须除顶端丛生一撮刚毛外，在亚末节生2根粗大感觉毛。颚腺管上的萼呈心形，其远侧有2—3个分叶状突起，近基端腺管较短，盲端不膨大或稍膨大。

前跗长108—118μ，爪长31—35μ，跗爪比=3.3—3.5。中垫长3—4μ，垫爪比=

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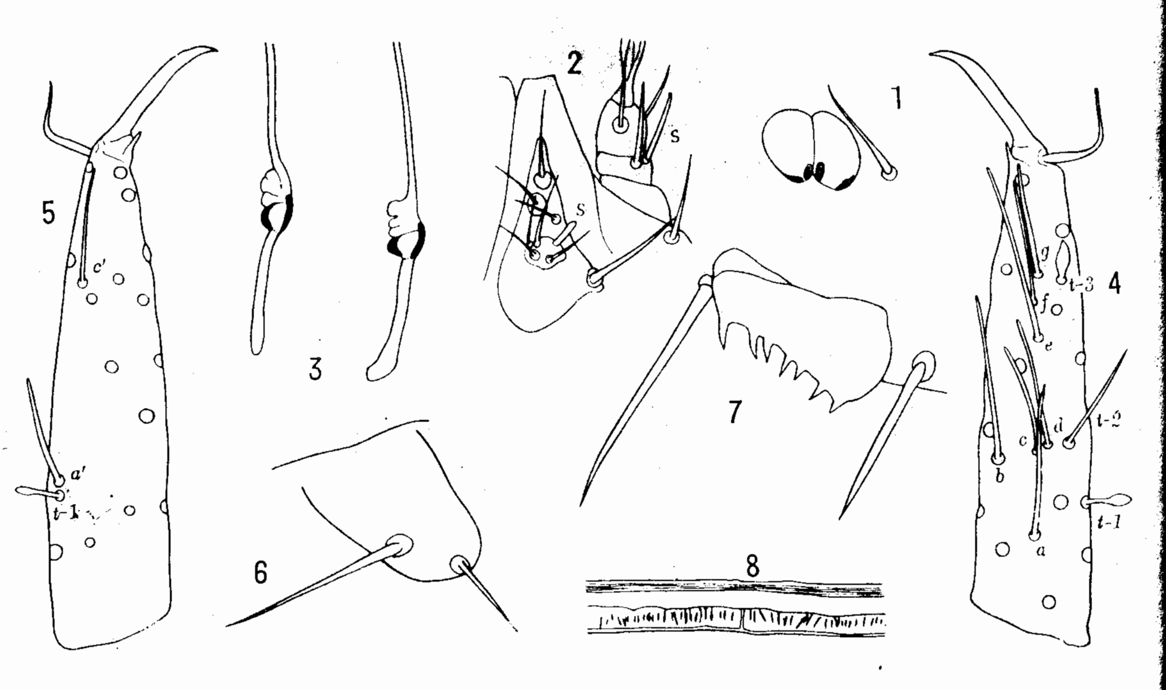


图 1—8 遵义南蚖*Notentulus zunyinicus* gen. *et* sp. nov. 新属、新种

1.假眼pseudoculus 2.下颚须和下唇须maxillary palp and labial palp 3.颚腺maxillary gland

4.前跗外侧面观exterior view of foretarsus 5.前跗内侧面观interior view of foretarsus

6.第Ⅲ腹足3rd abdominal appendage 7.栉梳comb 8.腰带striate band

0.09－0.1。背部感觉毛 *t* －1 棍棒形，基端比＝0.38－0.45。*t* －2 细长，*t* －3 为短而粗的锥形。外侧感觉毛 *a* 细长，顶端可达γ3；*b* 亦长大，顶端可超过 *f* 的基部；*c* 稍短，*d* 靠近 *c*，约与 *t* －2 位于同一水平；*e* 细长，顶端可达爪的基部，*f* 位于 *e* 和 *g* 的中间，长度约与 *g* 相等。内侧感觉毛*a*'粗大，近 *t* －1 但稍偏于远侧。缺*b*'。*c*'细长。中跗长51—55μ，爪长22μ；后跗长59—65，爪长23—24μ。

胸、腹部毛序见表 1 。

第Ⅰ腹足 2 节，生 4 刚毛；第Ⅱ—Ⅲ腹足均为 1 节，各生 2 刚毛，顶端刚毛约为次顶端刚毛长度之半。第Ⅷ腹节前缘的腰带具明显、不规则的短栅纹，排列亦不很规则。栉梳略倾斜，后缘稍凹进并生有不规则尖齿 7 — 9 枚。雌性外生殖器的基内骨较短，且骨化较弱，端阴刺尖形；雄性外生殖器的基内骨极长大。

全模：4♀♀，5♂♂，贵州遵义市内长征磷肥厂附近小丘上，海拔1040M，1985，Ⅹ－6，汤伯伟，金根桃采。

雄性前成虫：全长1120μ。头长125μ，假眼 8 ×11μ。前跗长98—99μ，爪长28.0μ，跗爪比＝3.56， 垫爪比＝0.09，基端比＝0.43。中跗长 50μ，爪长 21μ；后跗长 53μ，爪长22μ。

表1.　遵义南蚖 (*Notentulus zunyinicus*) 成虫和各幼虫期毛序表

		第Ⅰ幼虫		第Ⅱ幼虫		童虫		成虫	
		毛列	初生毛	毛列	次生毛	毛列	再生毛	毛列	补生毛
背面	胸Ⅰ	4		4		4		4	
	Ⅱ—Ⅲ	4/8	A2•M P1•2•3•4	6/14	A4 P1′•5•5′	6/16	P2′	6/16	
	腹—Ⅰ	0/8	P1•2•3•4	0/10	P2′	6/10	A1•2•5	6/12	P1′
	Ⅱ—Ⅲ	0/10	P1•2•3•4•5	0/14	P2′•4′	6/14	A1•2•5	6/16	P1′
	Ⅳ—Ⅴ	0/10		0/14		6/14		6/16	P1′
	Ⅵ	0/10		0/14		6/14		8/18	A4 P1′3′
	Ⅶ	0/10		0/14		7/18	Ac•2•4•5 P1′•3′	7/18	
	Ⅷ	0－6/6	M2•3•4 P2•3•5	2－6/8	A4 P4	6－7/8	A2•3•Mc	6－8/8	-Mc+M1
	Ⅸ			8	1•3•4•5	12	2•3′	14	4′
	Ⅹ					8	1•3•4•5	12	2•3′
	Ⅺ					6		6	
	尾Ⅻ	9		9		9		9	
腹面	胸Ⅰ	2－2/4	A1•M1 P1•2	2－2/4		4－4/6	A2•M2 P3	4－4/6	
	Ⅱ－Ⅲ	5－2/2	Ac•2•3•M P1	5－2/4	P2	7－2/4	A4	7－2/4	
	腹Ⅰ	0/2	P1	3/2	Ac•2	3/2		3/4	P2
	Ⅱ－Ⅲ	0/3	Pc•3	1/3	Ac	3/5	A2 P2′	3/5	
	Ⅳ－Ⅶ	1/4	Ac P2•3	1/6	P1	3/8	A2 P1′	3/8	
	Ⅷ	2	2	4	1	4		4	
	Ⅸ			4	1.2	4		4	
	Ⅹ					4		4	
	Ⅺ					2	2	6	1.3
	尾Ⅻ	8		8		6		6	

腹部第Ⅵ节背板的毛序为8/16，缺P3′，其余各节毛序均与成虫相同。雄性外生殖器发育不全，只可见短粗透明的后半段。

童虫（若虫）：的腹节与成虫数目相同，也是12节，但外生殖器尚未出现。全长920—960μ。头长108—114μ，假眼6—8×8—10μ。前跗长86—89μ，爪长26—28μ，跗爪比=3.2—3.4，垫爪比=0.11，基端比=0.38—0.40。中跗长41μ，爪长15—17μ；后跗长45—47μ，爪长18—19μ。腹部第Ⅰ—Ⅵ节背板后排生刚毛7对，比成虫少一对

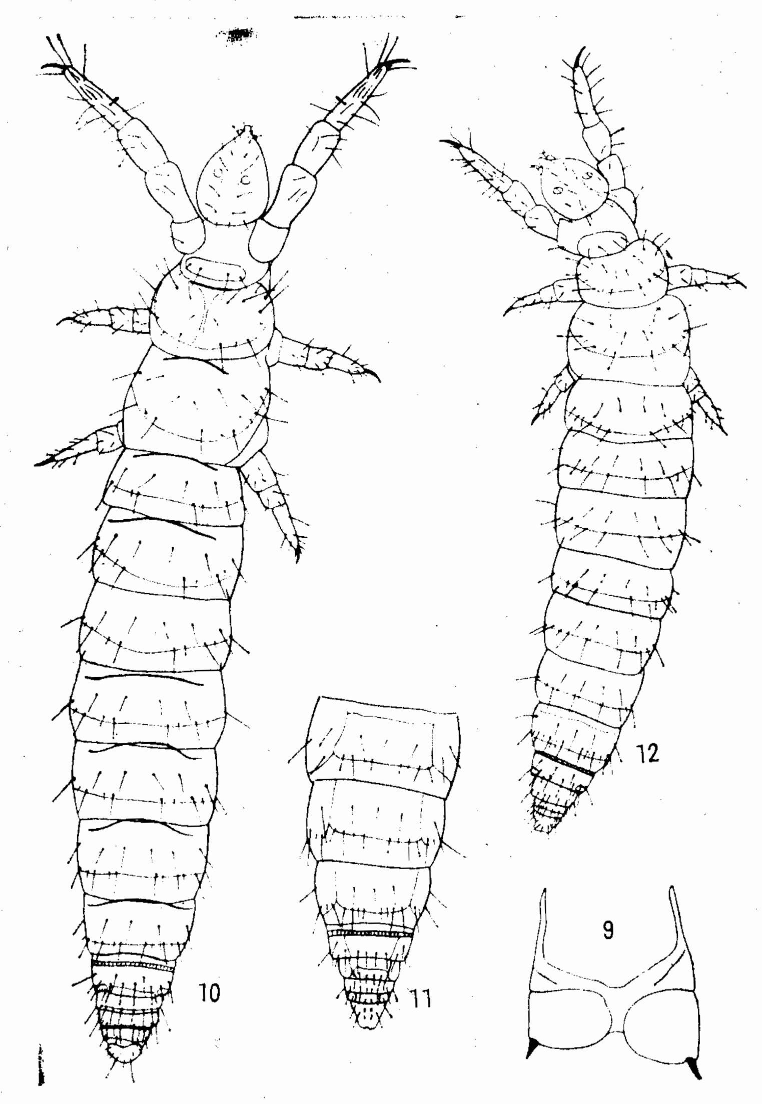


图 9—12 遵义南蚖的雌虫和童虫Female and maturus junior of *Notentulus zunyinicus* gen. *et* sp.nov.
9.雌性外生殖器female squama genitalis 10.成虫背面观dorsal view of an adult
11.第Ⅴ—Ⅻ腹节腹面观ventral view of abdominal segment Ⅴ—Ⅻ
12.童虫背面观dorsal view of a maturus junior.

P1′，第Ⅵ节前排也比成虫少一对刚毛，共为3对。此外，第Ⅺ节腹板仅生1对刚毛，比成虫少3两对。

第Ⅰ幼虫：腹部共10节，比童虫时期少2节。全长750—790μ。头长95—97μ，假眼6－8×8－10μ。前跗长61—71μ，爪长23—25μ，跗爪比＝2.6—2.9。垫爪比＝0.08—0.09，基端比0.44—0.45。中跗长30—33μ，爪长16—17μ；后跗长33—39μ，爪长17—18μ。腹部第Ⅰ—Ⅵ节背板无前刚毛，Ⅰ—Ⅶ节腹板前刚毛只有Ac一根。但尾节（Ⅻ节）腹面却比成虫和童虫多生一对刚毛共成4对。

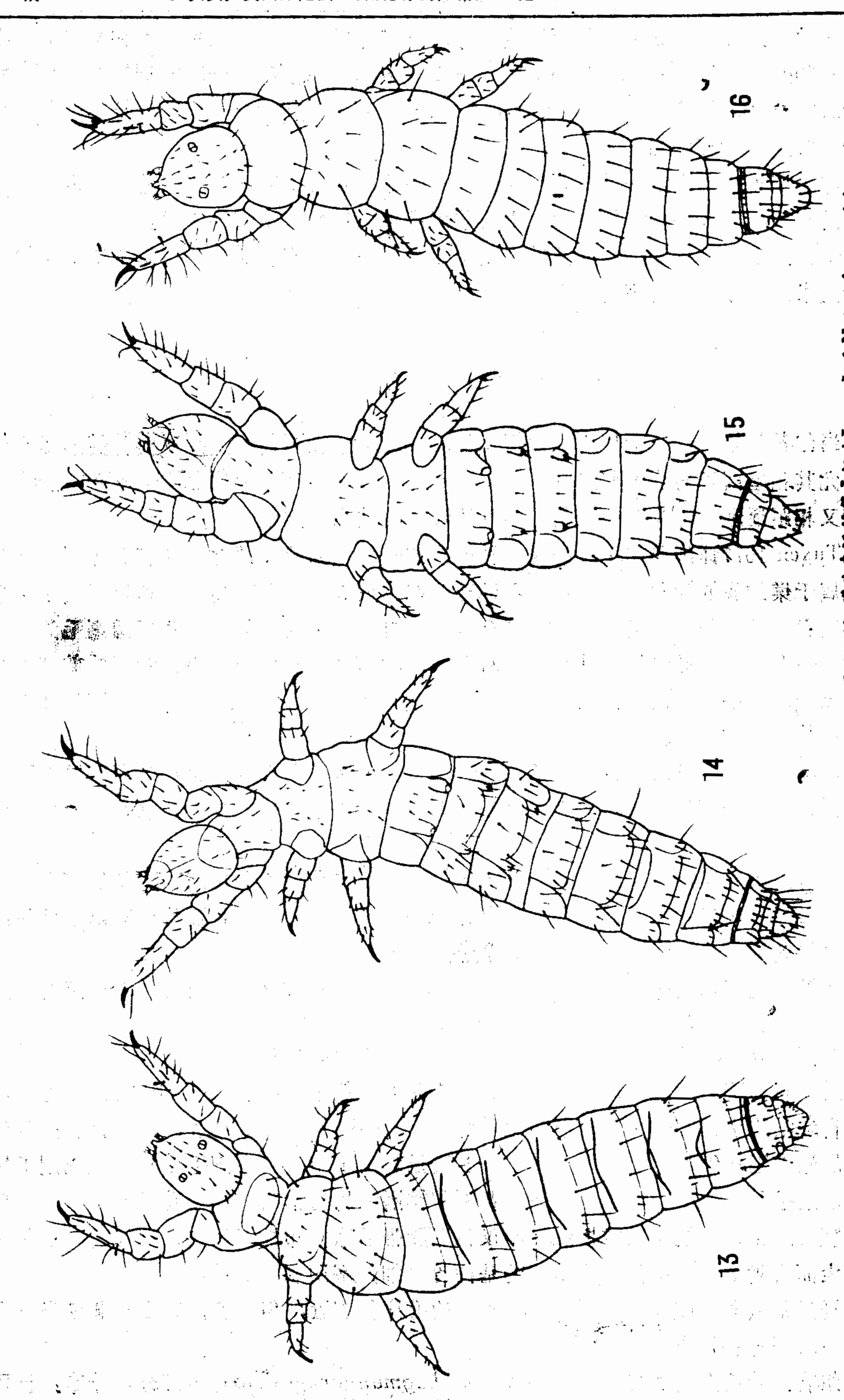


图13—14　遵义南蚖的第Ⅱ幼虫Larva II of *Notentulus zunyinicus* gen. *et* sp. nov.
13. 背面观dorsal view　14. 腹面观ventral view

图15—16　遵义南蚖的第Ⅰ幼虫Larva I of *Notentulus zunyinicus* gen. *et* sp. nov.
15. 腹面观ventral view　16. 背面观dorsal view

第Ⅰ幼虫：腹部共9节，即第Ⅷ腹节之后直接与尾节相连，缺Ⅸ、Ⅹ和Ⅺ三节。全长520—560μ。头长70—83μ，假眼6—8×7—8μ。前跗长47—55μ爪长16—22μ，跗爪比＝2.7—3.0，垫爪比＝0.09，基端比＝0.4—0.5。中跗长24—26μ，爪长12—14μ；后跗长30—37μ，爪长12—16μ。

腹部毛序较少，第Ⅰ—Ⅳ节背板尚无前排刚毛，后排仅有5对主刚毛；腹板第Ⅰ—Ⅲ节缺前刚毛，第Ⅳ—Ⅶ节仅有中央1根前刚毛，而第Ⅻ节生刚毛4对。

前幼虫：未发现。原尾虫的前幼虫很难采到，一般腹部为9节，与第Ⅰ幼虫相同，但口器尚未完全分化，毛序更为简单。

讨　　论

1.当作者开始对这一新种进行分析比较时，发现它和南美洲的檗蚖属种类颇多相似之处，尤其和墨西哥的热带檗蚖（*Berberentulus tropicus*）更为近似，但在地理分布上却又相距遥远，究竟哪一处是它的发源地，目前尚难判定。

2.Tuxen 1977详细研究了檗蚖属42种的形态特征和系统渊源之后，将此属划分为二。隶属于檗蚖属的18种，又按特征和地理分布分成5组。同时他又特别指出其中两个组值得注意：其一是澳洲组的5种都具有重要的祖征b'和腹部第Ⅵ节背板前刚毛为6的衍征。另一个是亚马逊组的4种都具有两个衍征，即t-3为长钻形和腹部背板的前刚毛为单数。此外，文中还述及墨西哥的热带檗蚖（*Berberentulus tropicus*）具有好几个新征，也和其他檗蚖不同。

以后，Tuxen 1981对蚖科（包括现今的蚖科、檗蚖科和囊腺蚖科）各属的腰带和腹足等特征进行了全面地比较后，把澳洲组的6种划分出来，成立了兼蚖属（*Amphientulus*）。

通过对南美洲檗蚖属各个种类的分析比较，可见巴西的4种檗蚖不论从形态上、或地理分布上，都应当和檗蚖属的其他种类分开另立新属，为此作者建议建立以下新属：

亚马逊蚖属*Amazonentulus* Yin，**新属**

模式种：巴西亚马逊蚖 *Amazonentulus brasilianus*（Nosek 1973）新组合　分布：巴西

同种异名：*Berberentulus brasilianus* Nosek 1973

属檗蚖科；下唇须退化，生有3刚毛和1感器；假眼近圆形；颚腺管上的萼呈心形，近盲端稍膨大，常分2叶。前跗感觉毛$t-1$棍棒形，$t-3$特长，呈尖锥形；外侧和内侧的感觉毛均细长，b'缺如。第Ⅱ—Ⅲ腹足均为1节，各生刚毛2根，顶端刚毛短于次顶端刚毛长度之半。腹部Ⅰ—Ⅶ节背板前排刚毛均为单数，即生有Ac刚毛。第Ⅷ腹节的腰带退化，栅纹不见或栅纹短小仅位于腰带后缘。栉梳略倾斜，后缘平直或凹进，具大而尖齿数枚。雌性外生殖器的基内骨尖细，端阴刺亦尖细。

亚马逊蚖属与鲍蚖属（*Bolivaridia*）的毛序很相近，但二者的第Ⅱ—Ⅲ腹足的刚毛数和下唇须等特征不同。

新组合：哈氏亚马逊蚖*Amazonentulus hagmannarum*（Tuxen 1976）。分布：巴西

同种异名：*Berberentulus hagmannarum* Tuxen 1976

　　奥氏亚马逊蚖*Amazonentulus ovei* (Tuxen 1976) 分布：巴西

同种异名：*Berberentulus ovei* Tuxen 1976

　　亚马逊蚖*Amazonentulus amazonicus* (Nosek 1972) 分布：巴西

同种异名：*Berberentulus amazonicus* Nosek 1972

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A NEW GENUS OF BERBERENTOMIDAE (PROTURA) FROM GUIZHOU PROVINCE WITH DESCRIPTION OF LARVAL STAGES AND SUGGEST OT ERECT A NEW GENUS *AMAZONENTULUS*

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The present paper describs a new species of Protura, which is representing a new genus of Berberentomidae. All the specimens were collected from Zunyi, Guizhou Province, by Tang and Jin in Oct. 1985. The types are preserved in the collection of Shanghai Institute of Entomology, Academia Sinica.

Notentulus Yin gen. nov.

Type species, *Notentulus zunyinicus* Yin, gen. *et* sp. nov.

Berberentomid with 2-4 setae and a sensilla on labial palp. The abdominal appendage Ⅱ—Ⅲ each with 2 setae, the apical one lateral and about half the length of the subapical one. Sensilla *t*-1 on foretarsus baculiform, and *b′* absent. Abdominal tergite Ⅶ with uneven number of anterior setae. The striate

band with short irregular striae and arranged in, omre or less, a waved line. Comb oblique and slightly concave, armed with sparsely sharp teeth. One row of 4 setae on sternite Ⅷ. Female squama genitalis weak, with pointed stylus.

To the new genus belong the Mexican species:

Notentulus tropicus (Bonet 1942) comb. nov.

syn. *Acerentulus tropicum* Bonet 1942, *Acerntulus tropicus* Tuxen 1961, *Berberentulus tropicus* Tuxen 1964.

Notentulus zunynincus Yin, gen. *et* sp. nov. (Figs. 1-16)

Total length 1300-1460 μ. Head 124-133 x 89-94 μ, with a short rostrum about 8-10 μ long. Pseudoculus broader than long, 8-9 x 10-12 μ, PR = 14-16. Labial palp with 4 setae and a sensilla. Maxillary papl with a tuft on tip and 2 strong sensillae on penultimate segment. The calyx on the canal of maxillary gland is heart-shaped with lobed distal excrescencies, and the proximal canal without distinct dilatation on the blind end.

Foretarsus 108-118 μ in length and claw 31-35 μ, TR = 3.3-3.5. Empodium 3-4 μ long, EU = 0.09-0.1. Dorsal sensilla *t*-1 claviform, BS = 0.38 - 0.45; *t* - 2 thin and long, *t* - 3 stout and cone-shaped. Exterior sensillae *a* long, its tip reaching to γ3, *b* surpassing the base of *f*, *c* slightly shorter than *d*, *d* very near to *c* and in the same level with *t*-2. *e* long, reaching the base of the unguis; *f* at the middle of *e* and *g*, and about the same length as *g*. Interior sensillae *a'* broader and slightly distal to *t*-1. *b'* absent. *c* thin and long. The midtarsus 51-55 μ in length, claw 22 μ; hindtarsus 59-65 μ long, and claw 23-24 μ.

The thorasic and abdominal chaetotaxy as shown in table 1.

The Ⅰ—Ⅲ abdominal appendages 1-segmented, each bearing a long subapical and a shorter apical seta, which about half the length of the longer one. Abdominal tergite Ⅶ with 4 pairs of anterior setae and 9 pairs of posterior setae. Tergite Ⅶ with exceptional 7 anterior setae. The striate band with irregular short striae. The comb concave and fringed with 7-9 sharp teeth posteriorly. Female squama genitalis with pointed stylus.

Syntype: 4 ♀♀, 5♂♂, Zunyi, Guizhou Province, alt. 1040 M, Oct.-6, 1985, by B. Tang and G. Jin.

Preimago: Total length 1120 μ and head 125 μ long. Psudoculus 8 x 11μ. Foretarsus 98-99 μ long, claw 28 μ, TR = 3.56. EU = 0.09. BS = 0.43. Midtarsus 50 μ long and claw 21 μ; hindtarsus 53 μ long and claw 22 μ. The chaetotaxy is nearly the same as the adult, with the only exception is 8/16 setae on tergite Ⅶ, p3' not yet appeared. The male squama genitalis not fully developed, only the posterior half can be observed.

Maturus junior: Total length 920-960 μ. Head 108-114 μ long, pseudoculus 6-8 x 8-10 μ. Foretarsus 86-89 u in length, claw 26-28 u, TR = 3.2-3.4; EU = 0.11. BS = 0.38-0.40. Midtarsus 41 μ long, claw 15-17 μ, hindtarsus 45-47 μ long, claw 18-19 μ. The chaetotaxy was tabulated in table 1.

Larva Ⅱ: Total lenght 750-790 μ. Head 95-97 μ long. Pseudoculus 6-8 x 8-10 μ. Foretarsus 61-71 μ in length, claw 23-25 μ, TR = 2.6-2.9. EU = 0.08-0.09. BS = 0.44-0.45. Midtarsus 30-33 μ long and claw 16-17 μ; hindtarsus 33-39 μ long, claw 17-18 μ.

Larva Ⅰ: Total length 520-560 μ. Head 70-83 μ long, pseudoculus 6-8 x 7-8 μ. Foretarsus 47-55 μ long and claw 16-22 μ, TR = 2.7-3.0, EU = 0.09, BS = 0.4-0.5. Midtarsus 24-26 μ long, claw 12-14 μ; hindtarsus 30-37 μ long and claw 12-16 μ.

Discussion: 1. As comparing the oriental new species with all the known species of *Berberentulus*, we found that it is, however, closely related to the Mexican species *B. tropicus*, althrough they are existing far away from each other.

2. After a detailed study on the morphology and phylogeny of 42 species of *Berberntulus*, Tuxen 1977 divided this group into two. And arranged the 18 species of *Berberentulus* into 5 subgroups. In the same time he pointed out that, The Australian species are held together by a plesiomorphous character of great importance, the presence of *b′*, and an apomorphous one, the number of anterior setae of tergite Ⅵ. The Amazonian group is held together by two important apomorphous characters, the awl-shaped *t*-3 and the uneven number of anterior tergal setae. … Finally the Mexican species *tropicus* is characterized by several apomorphous characters. And as a result, Tuxen 1981 took out the six Australian species and built up a new genus *Amphientulus*.

3. As for the 4 Amazonian species, the present author suggest to erect a new genus:

Amazonentulus Yin, gen. nov.

Type species: *Amazonentulus brasilianus* (Nosek 1973) comb. nov.

syn. *Berberentulus brasilianus* Nosek 1973

Berberentomid with 3 setae and a sensilla on labial palp. Sensilla *t*-1 claviform, *t*-3 very long and awl-shaped. *b′* absent. the Ⅰ—Ⅲ abdominal appendages 1-segmented, each with 2 setae, the apical one shorter than half length of the subapical one. Tergite Ⅰ—Ⅵ with uneven number of anterior setae. The straite band reduced, without striae or with very short striae. Female genitalis with sharp pointed stylus.

The chaetotaxy of *Amazonentulus* is similar to that of *Bolivaridia*, but

they can be distinguished by the number of setae on the I-II abdominal legs and on the labial palp.

Amazonentulus hagmannarum (Tuxen 1976) comb. nov.

syn. *Berberentulus hagmannarum* Tuxen 1976

Amazonentulus ovei (Tuxen 1976) com. nov. syn *Berberentulus ovei* Tuxen 1976

Amazonentulus amazonicus (Nosek 1972) comb. nov.

syn. *Berberentulus amazonicus* Nosek 1972

Key words: Protura, Guizhou Province, *Notentulus*, *Amazonentulus*, Berberentomidae, larval stages.

赤斑羚（*Naemorhedus cranbrooki*）的核型

THE KARYOTYPE OF RED GORAL (*NAEMORHEDUS CRANBROOKI*)

关键词： 赤斑羚，核型

Key words: Red goral, karyotype

赤斑羚（*Naemorhedus cranbrooki*）是Hayman（1961）根据缅甸东北部阿东河谷的标本订名的一个新种。在我国仅分布于西藏东南部和云南西北部。是十分珍贵的国家一级保护动物。

上海动物园自繁一只雄性赤斑羚，双亲捕自西藏东南部。经体外皮肤细胞培养，常规染色体制片，以C带染色和硝酸银染色等技术，对动物核型进行了观察。

经300个中期相的观察，赤斑羚（*N. cranbrooki*）的2n=56(图1)。常染色体是27对近端着丝粒染色体。X染色体为一条大的近端着丝粒染色体，Y是一条最小的近端着丝粒染色体。

C带显示除Y染色体外，全部染色体着丝粒区都显示较强C带阳性。说明着丝粒区具有丰富的异染色质（图2）。这与施立明等（1986）观察的斑羚（*N. goral griseus*）C带相似。

图3箭头所示，赤斑羚（*N. cranbrooki*）有3对大的近端着丝粒染色体，远端部带有明显的银染核仁组织者（Ag-NORs）。

Hsu & Benirschke（1973）曾报道一只圣地亚哥动物园的雄性赤斑羚（*N. g. cranbrooki*），原产地未注明，2n=55。其核型除一条亚中着丝粒的常染色体外，其余的53条常染色体全为近端着丝粒染色体。显然与我们的标本不同。

Wurster（1972）曾报道斑羚（*N. goral griseus*）2n=55，核型中仅有一条大的亚中着丝粒染色体。染色体数目和核型特征与Hsu & Benirschke（1973）观察的赤斑羚（*N. g. cranbrooki*）相同。Soma *et al.*,（1980）发现来自贵州的斑羚（*N. goral*）2n=56(♀)，全部为近端着丝粒染色体。施立明等（1986）发现斑羚（*N. goral griseus*）2n=54(♂)，动物来自重庆动物园。核型中有一对大的亚中着丝粒染色体。赤斑羚二倍体染色体数目除2n=55的外，我们又证实也有2n=56的个体。看来，在斑羚属（*Naemorhedus*）核型进化中罗伯逊易位可能是一个重要因素。

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